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**The development and validation of the SOLES, a new scale measuring**

**engagement with mental health services in people with psychosis**

**“The SOLES”**

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## **Abstract**

### **Background:**

No reliable and well-validated patient-rated scale exists for measuring engagement with mental health services. Alliance scales are often used as a proxy measure and most are clinician-rated.

### **Aim:**

This study aimed to develop and validate the SOLES (Singh O'Brien Level of Engagement Scale), designed to measure engagement in people with psychosis.

### **Method:**

The SOLES was developed in focus groups and validated in patients with psychosis. Reliability was tested using Cronbach's alpha and split-half reliability. Factor analysis was conducted. Concurrent validity (correlating SOLES scores with measures of alliance, insight and satisfaction), discriminant validity and predictive validity (whether SOLES predicts drop-out) were tested.

### **Results:**

As some subjects had no keyworker two scales were developed, for with and without a keyworker; the SOLES16 and SOLES13. Both have good internal consistency, correlate with relevant scales and scores predict engagement

### **Conclusions:**

The SOLES is reliable, valid and is a potentially valuable research and clinical tool.

### **Declaration of interest:**

None

**Keywords**

- 1) Engagement
- 2) Disengagement
- 3) Psychiatric Rating Scales
- 4) Drop-out

## Introduction

Disengagement from psychiatric services presents a serious challenge; patients with psychosis who drop out of care have more social needs, are more unwell and more likely to be legally detained than those still in contact with services (Bindman et al., 2000, Bowden et al., 1980; Hellerstein et al 2001). There is increasing awareness of the problem (Sainsbury's Centre for Mental Health, 1998) and engagement is a focus of newer models of working such as assertive community treatment (ACT) (Burns, 2002).

However engagement is not a simple construct and is rarely explicitly defined. It has various components, some of which have been explored in qualitative research (Kirsh & Tate, O'Brien). The term is often conflated with that of alliance. A positive relationship does seem to influence outcomes; a meta-analysis described the alliance-outcome relationship as "moderate" (Martin, Garske, & Davis, 2000). Many alliance scales exist, but patients may form a relationship not with one professional but with services as a whole. Compliance and attendance measures are also often used to measure engagement; although they are related constructs patients may be complying despite poor relationships (Priebe, Watts, Chase, & Matanov, 2005) or attending reluctantly. Indeed Bale found in ACT patients the number of appointments kept was inversely related to keyworker-rated alliance (Bale, Catty, Watt, Greenwood, & Burns, 2006).

Despite the obvious importance of assessing engagement there are few user-rated scales. Hall's engagement scale is an observer rated measure, (Hall et al., 2001) which Gillespie et al went on to develop as a self-report measure by rewording it although only the preliminary evaluation has been described, demonstrating good test-retest and internal reliability (Gillespie, Smith, Meaden & Jones, 2004). Meaden et al also studied it, to see if there was a relationship with hospital use (Meaden, 2004). The overall score was not found to be related to hospital use although three

indices were. The Service Attitudes Questionnaire (SAQ) (Goodwin et al., 2003) was developed in focus groups and is patient-rated. There was patient participation in its development but the scale has not been robustly validated. The Homelessness Engagement and Acceptance Scale (HEAS) is clinician rated (Park et al., 2002) and found to be a predictor of accommodation status and adequacy of support network. The authors suggest that the scale can be used as a general engagement scale if the first question regarding homelessness is omitted. The Service Engagement Scale (SES) (Tait, Birchwood, & Trower, 2002) is a clinician rated scale with good test-retest reliability, further validated in a study finding that low engagement as measured by the SES was related to “sealing over” recovery style (Tait, Birchwood, & Trower, 2003).

Most of the engagement scales measure engagement from the clinician’s perspective. This has practical benefits but in terms of validity there is a case for obtaining the perspective of the patient, indeed research has shown poor concordance between patients’ and professionals’ ratings (Rothman, Hedrick, Bulcroft, Hickam, & Rubenstein, 1991). Service providers and patients may describe engagement in different ways. What is described as engagement by clinicians may be perceived as coercive by patients, who may disengage for valid reasons. Bale found a lack of correlation between patients’ and keyworkers’ views when measuring alliance (Bale, Catty, Watt, Greenwood, & Burns, 2006) and Simmonds states that alliance measures are better predictors of outcome when patient rather than therapist versions are explored (Simmonds, Coid, Joseph, Marriott, & Tyrer, 2001). Therefore it can be concluded that there is, as Tait suggested in 2002, a need for an engagement scale measured from the patients’ perspective (Tait, Birchwood & Trower, 2002) which has had patients involved in it’s development.

## **Aims**

The aim of the study was to develop and validate a patient-rated scale measuring engagement in psychosis. The objective was to develop a scale measuring engagement that has concurrent and predictive validity and to establish whether such a scale displays robust psychometric properties.

## **Methodology**

The electronic databases Medline, EMBASE and PsychInfo were searched using the search terms “engagement”, “disengagement”, “drop-out”, “psychosis”, “alliance”, “compliance” and “adherence”. The literature review highlighted the complexity of the term engagement which has been assessed using a number of proxy measures such as attendance, satisfaction, therapeutic alliance, insight, and adherence. Individual statement items were devised for each of these variables in a draft scale. Advice at this stage was sought from a team of mental health researchers and the scale was discussed in a series of three meetings. The group included a research methods adviser and clinicians with experience of treating difficult to engage patients.

The draft scale was then refined in a series of focus groups with patients and former patients. Four focus groups were organised, each with between six and eight participants; two held at day centres, one at a day hospital, and one at a service-users group. Participants were asked for their views on the draft scale and to generate any further items. Comprehension and acceptability of the items were assessed. None of the initial 10 items were discarded although wording was modified. Six new items were added to the scale.

### *Subjects*

Study subjects were patients admitted to Springfield Hospital (SPH) in South-West London over a ten month period from May 2002 to February 2003. SPH is a large inner-city hospital serving a socioeconomically and ethnically diverse population. Census data for the main borough shows a

Jarman Index of 23.1 and that 27% of the population have ancestral origin outside the UK; 5.4% Black Caribbean, 4.3% Black African, and 3.1% Indian (HMSO, 2001).

Inclusion criteria for entry into the study were

- i) Inpatient on an acute general psychiatric ward for a minimum duration of 5 days.
- ii) A primary clinician-made diagnosis of psychosis

Patients unable to speak English were excluded.

### *Sampling*

Each ward was visited twice a week when a researcher contacted the staff, establishing the diagnosis of all in-patients. Those with a diagnosis of psychosis were identified and the staff asked at each visit about their clinical condition. Once near discharge they were approached for informed consent. Ethical approval for the study was obtained from the Local Research Ethics Committee.

### *Interview*

A semi-structured interview was carried out. Sociodemographic and clinical details were established and the subjects were asked to complete the SOLES, the Insight and Treatment Attitudes Questionnaire (ITAQ) (McEvoy *et al.*, 1989), and the Helping Alliance Questionnaire (HAQ) (Priebe and Gruyters, 1993). Satisfaction with mental health services was rated by asking patients to rate their satisfaction on a 10-point scale; this has been demonstrated to have a good correlation with more structured assessments of satisfaction (Greenwood *et al.*, 1999).

### *Follow-up*

Predictive validity was tested by relating SOLES scores to drop-out and appointment attendance. At one year after discharge, between May 2003 and March 2004, notes of all patients were reviewed and the information gathered:

- i) Whether the subjects had dropped out; defined as missing three consecutive appointments.
- ii) If subjects had dropped out, whether they then returned to contact with services or not (within the year) and if so whether this was voluntarily or by formal detention
- iii) Proportion of appointments attended over one year: All appointments (outpatient appointments, home visits and community visits) offered and kept were recorded to produce a ratio.

Reliability was established using split-half measure and Cronbach's alpha. Item-total correlations have been reported to establish that the items are sufficiently related to each other but do not exhibit signs of item redundancy (fall between 0.2 and 0.8). Validity was assessed by determining construct, concurrent, discriminant and predictive validity. Factor analysis was used to test for the presence of an underlying factor structure as engagement was felt to be potentially a multi-dimensional construct. The Velicer's minimum average partial (MAP) test and the parallel analysis test were used to guide the number of factors to be extracted (O'Connor, 2000). In the Velicer's MAP the average of the squared partial correlation is calculated after each of the components has been partialled out. When the minimum average squared partial correlation is reached, no further components are extracted. In the parallel analysis test the number of factors that account for more variance than the number of factors derived from random data is calculated. These two methods are recommended to be used in conjunction (Zwick, 1986). Orthogonal rotation using the varimax procedure was used on extracted factors. The extracted and rotated factors were examined by identifying items with a rotated factor loading of 0.4 or greater. To establish concurrent validity Pearson correlation coefficients were tested between the mean overall SOLES, and those of the other scales. Predictive validity was determined by investigating the relationship between the SOLES score and three objective measures of

disengagement, 1) disengaged over year, 2) attended less than 90% of appointments, and 3) engaged at one year, disengaged over one year, disengaged and sectioned back by one year. Univariate analysis was carried out first to explore which clinical and socio-demographic variables were related to the three outcomes. Those significant at the 10% level were entered into a logistic regression for outcomes 1 and 2, multinomial logistic regression for outcome 3, using a forward selection method. A further analysis explores how the mean levels of SOLES differ between the groups using two-sample t-tests for outcomes 1 and 2, and one way analysis of variance for outcome 3. ROC analysis was performed to suggest the optimal cut-off for the SOLES score. Discriminant validity established the relationship between sociodemographic factors and SOLES score, again using logistic regression after univariate analysis. Data analysis was done using SPSS16 for Windows.

## **Results**

During the study period 670 patients had at least one admission. 304 subjects were eligible for inclusion in the study (see figure 1).

184 patients completed the SOLES. Sociodemographic and clinical characteristics of subjects compared to the rest of the sample are described in table 1. Patients who took part in the study were more likely to be employed and less likely to be detained.

Fifty-six patients (36%) did not have a keyworker at the time of interview and couldn't answer the first three items; 128 subjects completed all of them. Mean and standard deviation of scores are reported in Table 2. The whole range of scores, 0 – 10, was used. Mean SOLES scores were obtained for all 184 subjects by calculating the mean of all non-missing items. Two versions of the SOLES are therefore proposed; SOLES16 and SOLES13 (the 13 item version for those who do not have a keyworker).

The SOLES13 and SOLES16 scales have 13 and 16 items respectively, each item scoring between 0 and 10 (see appendix 1). For one question, question 13, the score is reverse scored. Both SOLES13 and SOLES16 are calculated as the mean of all non-missing items and therefore have a range of 0-10, a higher score indicating better engagement. The mean SOLES16 score for the 128 subjects was 6.8 (SD 2.2), median score was 7.0. Both scales were normally distributed.

#### *Reliability and validity*

For the SOLES13 Guttman split-half was 0.80 and the Cronbach's alpha was 0.90. For the SOLES16 the Guttman split-half was 0.89 and the Cronbach's alpha was 0.91. Therefore both versions demonstrate high internal consistency. The item-total correlations ranged from 0.44 to 0.76 for SOLES13 and 0.23 to 0.76 for SOLES16.

#### *Factor structure*

The Velicer's MAP and the parallel analysis test identified that for both the SOLES13 and SOLES16 two factors should be extracted, factor 1 "acceptance of need for treatment" and factor 2 "perceived benefit of treatment". The rotated factor loadings are presented in table 3 along with the percentage of variance explained. It can be seen a non-simple structure is exposed. Three items load significantly on to both factors. 'I attend appointments with my keyworker' does not

load significantly ( $>0.4$ ) onto either factor. While there is some consistency in the factor structures the factors are not explicitly interpretable and subscales are not explored further.

#### *Concurrent validity*

Correlations were tested between scores on both versions of the SOLES and those on ITAQ, HAQ and satisfaction. All three measures were significantly correlated with the SOLES13 and SOLES16 scores,  $p < 0.001$ . For the SOLES16 the Pearson correlations were 0.70 (95% CI 0.62-0.77) for the HAQ, 0.73 (95% CI 0.66-0.79) for the ITAQ and 0.68 (95% CI 0.57-0.73) for the satisfaction scale. For SOLES13 the Pearson correlations were 0.69 (95% CI 0.61-0.76) for the HAQ, 0.74 (95% CI 0.67-0.80) for the ITAQ and 0.67 (95% CI 0.58-0.74) for the satisfaction scale.

#### *Predictive validity*

A detailed description of clinical and sociodemographic factors predicting drop out will be reported elsewhere. Only two factors, after logistic regression, predicted drop out. These were substance use (OR 3.1, CI 1.4-7.0,  $p = 0.005$ ) and SOLES score (OR 1.4, CI 1.16-1.56,  $p = 0.00$ ). Poor appointment attendance was predicted by alcohol misuse (OR 2.92, CI 1.2-7.1,  $p = 0.017$ ) and SOLES score (OR 1.24, CI 1.1-1.4,  $p = 0.004$ ). Young age predicted being returned to contact by section (OR 1.11 CI 1.10-1.25,  $p = 0.05$ ). Thirty-eight of the 184 subjects dropped out over the year (20.6%). A t-test demonstrated that those who dropped out had a significantly lower SOLES13 and SOLES16 scores (SOLES13 mean for subjects dropping out: 4.9, SD. 1.9,  $n = 38$ ; those not dropping out: 6.9 SD. 2.2  $n = 146$ ;  $t = 4.9$   $df = 182$ ,  $p < 0.001$ , SOLES16 mean for subjects dropping out: 5.5, SD. 1.8  $n = 24$ ; those not dropping out: 7.1, SD. 2.1  $n = 106$ ;  $t = 3.3$   $df = 128$   $p = 0.001$ ).

#### *Appointment attendance*

The proportion of appointments attended produced a bimodal distribution with a peak at 90% attendance and another at 10%. This outcome was therefore dichotomised. One hundred and twenty-two subjects (66%) attended more than 90% of appointments and 62 subjects (34%) attended less than 90% of appointments. A low SOLES13 and SOLES16 score was associated with poor attendance (mean SOLES13 score for over 90% attendance: 6.9, SD. 2.3, n=122; mean SOLES13 score for less than 90% attendance: 5.7, SD. 2.2 n=62;  $t=3.5$   $df=182$ ,  $p=0.001$ ; mean SOLES16 score for over 90% attendance: 7.1, SD. 2.2 n=89; mean SOLES16 score for less than 90% attendance: 6.2, SD. 2.2, n=41;  $t=2.3$ ,  $df=128$   $p=0.025$ ).

#### *Subjects returned to contact by formal detention*

The difference in mean SOLES13 and SOLES16 scores between subjects who (i) dropped out and were returned to contact by detention, (ii) those who dropped out and either were not seen within the follow-up period or returned to contact without formal detention, and (iii) those who did not drop out, can be seen in figure 2. Although there is some overlap of scores the trend seen is that of a relationship between SOLES score and engagement outcome. One-way analysis of variance showed that the mean scores differed significantly for both SOLES13 and SOLES16 ( $F=12.9$ ,  $df=2$ ,  $n=181$ ,  $p<0.001$  and  $F=6.3$ ,  $df=2$ ,  $n=127$   $p=0.003$  respectively).

#### *ROC analysis*

A ROC analysis was performed to establish the most appropriate cut-off point at which the SOLES predicts staying in contact. Staying in contact rather than dropping out as an outcome was chosen because the SOLES is designed as an engagement scale; higher scores representing better engagement. The area under the curve was 0.764, 95% CI: 0.687, 0.842. Estimates of sensitivity, specificity, positive predictive values (PPV) and negative predictive values (NPV) for prediction of engagement with 95% confidence intervals for 3 possible cut-offs are presented in Table 4.

### *Discriminant Validity*

When the relationship between the SOLES16 score (SOLES13 not reported here) and clinical and sociodemographic factors was analysed at a cut-off of  $p=0.1$  many variables were significant but after multiple regression at a  $p$ -value of 0.05 the significant factors were diagnosis (schizophrenia mean score 5.4, (CI 4.7-6.0), affective disorder 6.4 (CI 5.7-7.0), other psychotic diagnosis 6.4 (CI 5.7-7.5)); substance use (substance use mean score 5.6 CI 4.9-6.4, no use mean score 6.6, CI 6.0-7.1) and detention (detained mean score 5.6, CI 5.0-6.2, voluntary mean score 6.6 CI 6.0-7.3).

## **Discussion**

The SOLES is a new reliable and valid patient-rated scale predicting engagement.

The lack of a clearly accepted definition makes the validation of any engagement scale a challenge; there is no accepted “gold standard” against which to measure the SOLES results.

There are conceptual difficulties in determining predictive validity since the status of engagement may alter over time. The SOLES scores at the end of an admission did, however, relate to whether subjects dropped out over the year and whether they attended appointments.

It may be viewed as a limitation that no diagnostic screening interview was used; a clinician made diagnosis was felt to be appropriate. The study took place in one hospital in London so may not be generalisable to other settings, for example rural rather than inner-city communities; the SOLES needs to be validated in such settings.

The study had the strength of a large sample size and a diverse study population. Other strengths include a relatively low refusal and high follow-up rate and, unlike in many studies, drop-out was a clearly defined outcome measure.

The SOLES appears to be both valid and reliable. Factor analysis produced two constructs, “acceptance of need for treatment” and “perceived benefit of treatment”, suggesting two main components. Some of the items did not load on to either factor and consideration was given as to whether they should be removed from the scale; however this would have impacted on the scale’s predictive validity. As the factor solution is not readily interpretable it was felt that there was insufficient evidence to promote subscales of the SOLES; further research is required to explore the underlying factor structure in different populations.

The SOLES has internal consistency and concurrent validity when scores were compared to related scales and was related to the outcomes; whether subjects dropped out over the year, poor appointment attendance and if they dropped out needing to be returned to contact via section. At a cut-off of seven the SOLES16 had a sensitivity of 54% (CI 46-62) and a specificity of 89% (CI 74-97) to predict remaining in contact. The PPV and NPV results suggest that the SOLES is better at predicting engagement than disengagement. The PPV of any scale depends on the base rate of the outcome in the population. It should be clear that the SOLES is not just about predicting dropout; the scores should be considered as a continuous variable and used as a measure of engagement.

To some extent converting engagement into a numerical score simplifies a complex phenomenon. Nevertheless scales are necessary in psychiatric research and clinical practice, and the SOLES seems to capture the important elements encompassing engagement.

Useful scales exist but most are rated by professionals and the need for a validated patient-rated scale has been highlighted (Tait, Birchwood & Trower, 2002). It is hoped that the SOLES will be valuable both in clinical settings and as a tool to facilitate research in this important area.

## **References**

- Bale, R., Catty, J., Watt, H., & Burns T. (2006) Measure of the therapeutic relationship in severe psychotic illness: a comparison of two scales. *International Journal of Social Psychiatry*, 52 (3), 256-266.
- Bindman, J., Johnson, S., Szumukler, G., Wright, S., Kuipers, E., Thornicroft, G., Bebbington, P. & Leese, M. (2000) Continuity of care and clinical outcome: a prospective cohort study. *Social Psychiatry Psychiatric Epidemiology* 35, 242-7.
- Bowden, C. L., Schoenfeld, L. S. & Adams, R. L. (1980) A correlation between dropout status and improvement in a psychiatric clinic. *Hospital and Community Psychiatry* 31, 192-5.
- Burns T, F. M. (2002) Ingredients and standards (model fidelity). In *Assertive outreach in mental health: a manual for practitioners* Oxford university Press, Oxford.
- Gillespie, M., Smith J., Meaden A & Jones C (2004) Clients' engagement with assertive outreach services. *Journal of Mental Health*, 13, 439-452
- Goodwin, I., Holmes, G., Cochrane, R. & Mason, O. (2003) The ability of adult mental health services to meet clients' attachment needs: the development and implementation of the Service Attachment Questionnaire. *Psychological Psychotherapy* 76, 145-61.
- Greenwood, N., Key, A., Burns, T., Bristow, M. & Sedgwick, P. (1999) Satisfaction with in-patient psychiatric services. Relationship to patient and treatment factors. *British Journal of Psychiatry* 174, 159-63.
- Hall, M., Meaden, A., Smith, J. & Jones, C. (2001) Brief report: the development and psychometric properties of an observer-rated measurement of engagement with mental health services. *Journal of Mental Health* 10, 457-465.
- Hellerstein, D. J., Rosenthal, R. N. & Miner, C. R. (2001) Integrating services for schizophrenia and substance abuse. *Psychiatric Quarterly* 72, 291-306.
- HMSO (2001) 2001 Census. Ethnic group and country of birth. London.
- Killaspy, H., Banerjee, S., King, M. & Lloyd, M. (2000) Prospective controlled study of psychiatric out-patient non-attendance. Characteristics and outcome. *British Journal of Psychiatry* 176, 160-5.

- Kirsh, B., & Tate, E. (2006) Developing a comprehensive understanding of the working alliance in the community. *Qualitative Health Research*, 16 (8), 1054-1074
- Martin, D. J., Garske, J. P. & Davis, M. K. (2000) Relation of the therapeutic alliance with outcome and other variables: a meta-analytic review. *Journal of Consulting Clinical Psychology* 68, 438-50.
- McEvoy, J. P., Freter, S., Everett, G., Geller, J. L., Appelbaum, P., Apperson, L. J. & Roth, L. (1989) Insight and the clinical outcome of schizophrenic patients. *Journal of Nervous and Mental Disease* 177, 48-51.
- Meaden, A., Nithsdale, V., Rose, C., Smith, J., & Jones, C. (2004) Is engagement associated with outcome in assertive outreach? *Journal of Mental Health* 13, 415-424.
- O'Brien, L. (2000) Nurse-client relationships: The experience of community psychiatric nurses *Journal of the Australian and New Zealand College of Mental Health Nurses*, 9, 194.
- O'Connor, B. P. (2000) SPSS and SAS programs for determining the number of components using parallel analysis and Velicer's map test. *Behavior Research Methods, Instruments and Computers* 32, 396-402.
- Park, M. J., Tyrer, P., Elsworth, E., Fox, J., Ukoumunne, O. C. & MacDonald, A. (2002) The measurement of engagement in the homeless mentally ill: the Homeless Engagement and Acceptance Scale--HEAS. *Psychological Medicine* 32, 855-61.
- Priebe, S. & Gruyters, T. (1993) The role of the helping alliance in psychiatric community care. A prospective study. *Journal of Nervous & Mental Disease* 181, 552-7.
- Priebe, S., Watts, J., Chase, M & Matanov, A. (2005) Processes of disengagement and engagement in assertive outreach patients: qualitative study. *British Journal of Psychiatry*, 187, 438-443
- Rothman, M., Hedrick, S., Bulcroft, K., Hickam, D. & Rubenstein, L. (1991) The validity of proxy-generated scores as measures of patient health status. *Medical Care*, 29(2) 115-124

Sainsbury's Centre for Mental Health (1998). Keys to engagement: review of people with severe mental illness who are hard to engage with services.

Simmonds, S., Coid J., Joesph, P., Marriott, S., & Tyrer, P. (2001). Community mental health team management in severe mental illness: a systematic review. *British Journal of Psychiatry*, 178, 497-502.

Tait, L., Birchwood, M. and Trower, P. (2003) Predicting engagement with services for psychosis: insight, symptoms and recovery style. *British Journal of Psychiatry* 182, 123-8

Tait, L., Birchwood, M., & Trower P. (2002). A new scale (SES) to measure engagement with community mental health services. *Journal of Mental Health*, 2, 191-198.

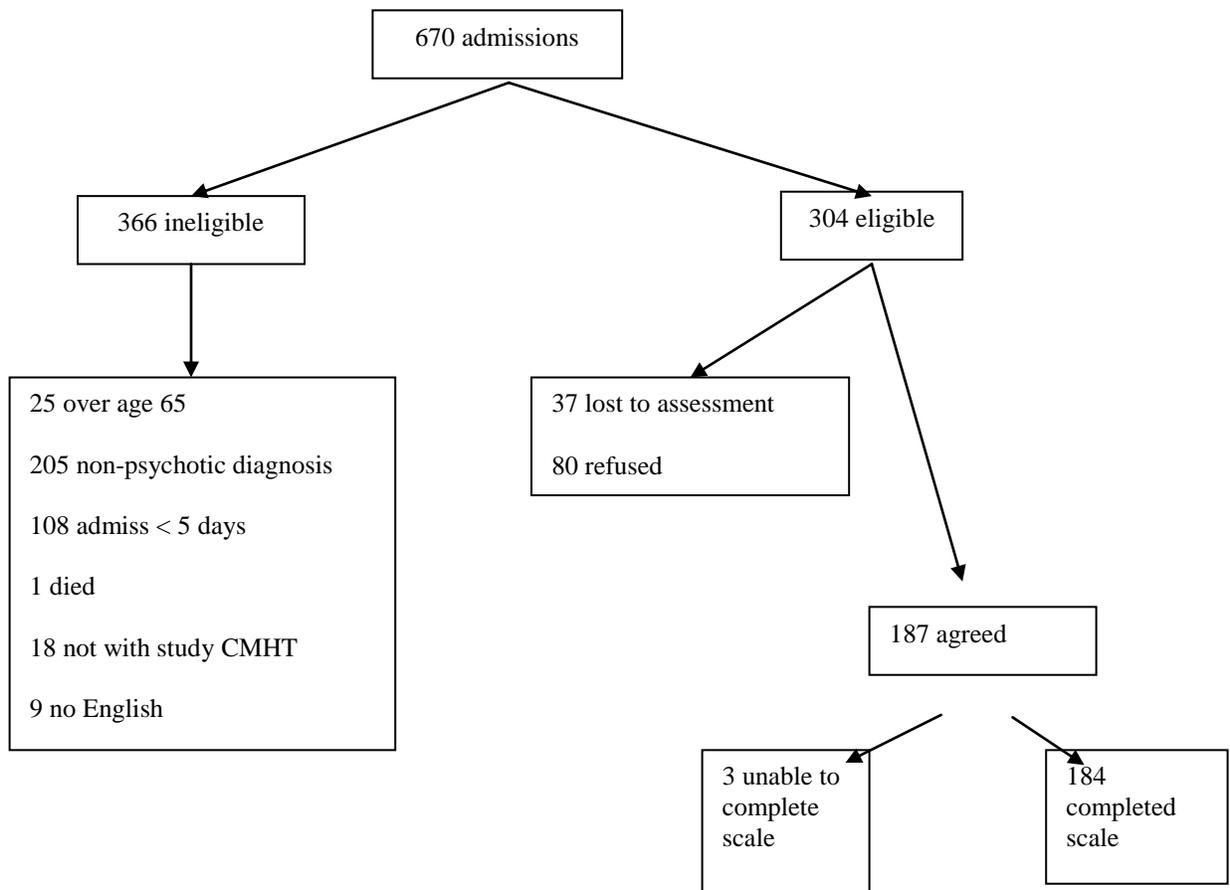
Zwick, W., & Velicer, W. (1986). Comparison of five rules for determining the number of components to retain. *Psychological Bulletin*, 99, 432-442.

**Table 1 Characteristics of participants and non-participants**

		Participants (184) Number (%)	Non- participants(120) Number (%)	$\chi^2/t$	Sig (p)
Gender	Male	108 (58.7)	65 (50.4)	2.117	0.900
Age (yrs) mean (s.d)		38.2 (12)	38.4 (12)	0.270	0.789
Ethnicity	White	52(28.3)	49 (38.0)	4.34	0.114
	Asian	107 (58.2)	60 (46.5)		
	African/Caribb	25 (13.6)	20 915.5)		
Marital status	Single	128 (69.6)	84 (65.1)	.699	0.705
	Married/cohab	28 (15.2)	22 (17.1)		
	Div/sep/widowed	28 (15.2)	23 (17.8)		
Employment	Work	40 (21.7)	11 (8.8)	16.6	0.000
	Training/education	12 (6.5)	1 (0.8)		
	Unemployed	132 (71.7)	113 (90.4)		
Diagnosis	Schizophrenia	96 (52.2)	82 (63.6)	4.107	0.134
	Affective disorder	66 (35.9)	35 (27.1)		
	Other	22 (12.0)	12 (9.3)		
MHA	Section	106 (57.6)	95 (73.6)	8.485	0.004

All p-values relate to  $\chi^2$  tests apart from where the mean and standard deviation are quoted when an unpaired t-test was used.

Figure 1 Subjects taking part in the study



**Table 2 Mean and standard deviation scores for each SOLES item.**

Item	Mean (sd)	n
1.	8.9 (2.1)	128
2.	7.1 (3.3)	128
3.	7.3 (3.1)	128
4.	6.0 (3.6)	184
5.	7.1 (3.3)	184
6.	5.9 (3.9)	184
7.	6.5 (3.5)	184
8.	6.2 (3.8)	184
9.	6.2 (3.7)	184
10.	7.8 (3.0)	184
11.	6.9 (3.2)	184
12.	6.2 (3.3)	184
13.	4.1 (3.4)	184
14.	6.8 (3.4)	184
15.	6.8 (3.2)	184
16.	7.6 (2.9)	184

**Table 3 Factor analysis. Factor loading for each construct**

1= Acceptance of need for treatment

2= Perceived benefit of treatment

Item	SOLES 13		SOLES 16	
	1	2	1	2
1	.86		.84	
2	.83		.79	
3	.78		.78	
4	.70		.72	
5	.67		.66	
6	.61	.55	.58	
7	.42		.41	
8		.78		.76
9		.77		.77
10		.71		.70
11		.69		.70
12	.48	.63	.45	.65
13	.47	.58	.43	.59
14			.56	
15			.46	.50
16			<0.4	<0.4
% variance explained by rotated factor	31.6	26.6	28.2	24.3

Figure 2a The SOLES13 and disengagement outcomes

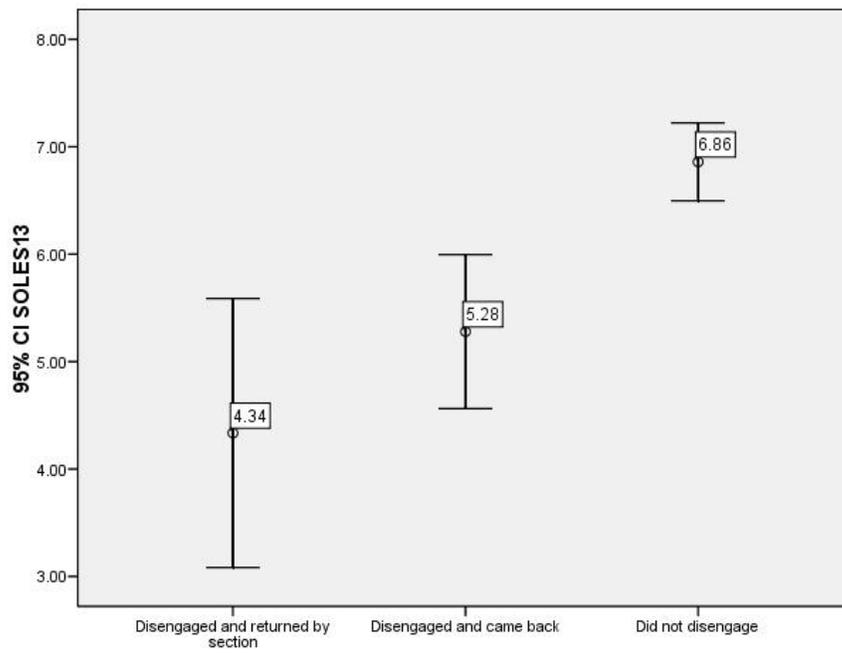
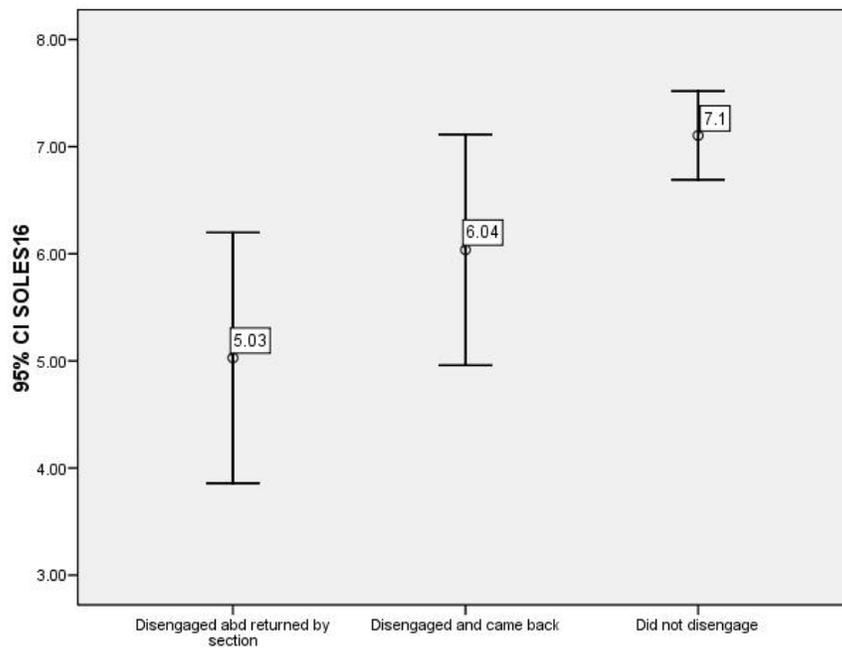


Figure 2b The SOLES16 and disengagement outcomes



**Table 4 – Sensitivity, specificity, PPV's and NPV's of possible cut-offs for predicting staying in contact**

Cut-off	SOLES 13				SOLES 16			
	Sensitivity (CIs)	Specificity (CIs)	PPV (CIs)	NPV (CIs)	Sensitivity (CIs)	Specificity (CIs)	PPV (CIs)	NPV (CIs)
6	70 (62-77)	71 (54-84)	90 (83-95)	38 (27-50)	75 (66-83)	58 (37-77)	89 (80-94)	35 (21-52)
<b>7</b>	<b>54 (46-62)</b>	<b>89 (74-97)</b>	<b>95 (87-98)</b>	<b>33 (24-43)</b>	<b>58 (49-68)</b>	<b>79 (57-92)</b>	<b>93 (83-97)</b>	<b>30 (19-43)</b>
8	35 (27-43)	92 (78-98)	94 (84-99)	27 (20-36)	58 (49-68)	79 (57-92)	93 (83-97)	30 (20-43)

## Appendix 1 The SOLES- The Singh O'Brien Level of Engagement Scale

Please rate from 0 to 10 your agreement with the following statements

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0      1      2      3      4      5      6      7      8      9      10

not at all

entirely

1. I attend appointments with my keyworker
2. I need to see my keyworker regularly
3. I find seeing my keyworker helpful
4. I need to be involved with mental health services
5. I have benefited from mental health services
6. I have a mental health problem
7. I find my psychiatrist helpful
8. I need to take psychiatric medication
9. I find psychiatric medication helpful
10. I always take my medication

11. I feel I get enough practical support  
from mental health services
12. I feel I get enough emotional support  
from mental health services
13. I can cope by myself without contact  
from mental health services
14. Admissions to hospital have been helpful
15. I feel listened to by health professionals
16. I can get help from mental health services when I need it

*(The score on question 13 is reverse scored)*